

Federal Non-Tactical Vessel (FNTV) Biodiesel Initiative

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FNTV Biodiesel Initiative

- Working group established in August 2010 (NOAA, USACE, MARAD, DLA-ENERGY)
- Adapted NOAA's Lake Michigan Field Station methodology:
 - **Optimize** the Fuel Process (suppliers, delivery, storage, consumption)
 - **Adjust** process variables to reflect what's known
 - **Monitor** process controls that could be impacted
 - **Measure** changes to output, and process
 - **Readjust** based on experience
 - Based on LMFS's 12+ years experience with biodiesel, ~500 vessels, 1M gallons/yr
 - Proven cold weather usage, reduced maintenance, reduced GHG emissions
 - FNTV collectively consumes ~10M gallons diesel annually

Why Biodiesel?

- Operating costs always increasing, so any fuel consumption reduction = cost savings
 - Hull coatings
 - More efficient engines
 - Economical operation
 - Improved hull forms
 - **Alternative fuels**
 - USACE has ~2300 floating plant assets
 - Consume ~8.4M gallons of diesel annually (FY08 baseline)
 - Average cost in FY08 was \$2.46/gallon = **~\$20,172,000**



Why Biodiesel?

- Increasing air quality restrictions
 - California now requires Tier 2 engines on vessels (0.1% ULSD)
 - 1.0% ULSD required nationally (moving to 0.1% by 2015)
- States now requiring blends of biodiesel
 - Minnesota: B2 in 2005, B5 in 2009, B10 in 2012, B20 in 2015
 - Oregon: B5 in 2011
 - Washington: B2 in 2008
 - Massachusetts & Louisiana also require biodiesel blends

- Executive Order 13514 Greenhouse Gas (GHG) Emissions Reductions
 - USACE target is 23% reduction in GHG emissions by 2015 – Floating Plant is part of that target
- National Security Implications of Petroleum Dependency

“By having reliable and abundant alternate sources of energy, we will no longer be held hostage by any one source of energy, such as petroleum.”

RADM Phillip Cullom, Oct 2010

“Diversifying energy sources and moving away from fossil fuels where possible is critical to future energy security.”

Powering America's Defense, Military Advisory Board, May 2009

Biodiesel Advantages/Challenges

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| <ul style="list-style-type: none"> ▪ Lower emissions than petroleum-based fuels ▪ Lower environmental impact – as biodegradable as sugar and ten times less toxic than table salt ▪ Renewable energy source ▪ Improved health and safety – less-offensive odor, higher flash point, can reduce carcinogenic properties (compared to diesel fuel) by 94% ▪ Improved engine performance – higher lubricity and solvent levels ▪ Reduced engine maintenance | <ul style="list-style-type: none"> ▪ Cold flow properties ▪ Power reduction ▪ Material compatibility ▪ Filter plugging ▪ Lube oil dilution ▪ Microbial growth ▪ Water separation ▪ Storage stability ▪ Original Engine Manufacturer Warranties ▪ Cost |
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USACE Test Plan

- Conversion Process
 - Education
 - Pretrial Assessment
 - Action Plan
 - Post-trial Assessment



- Four locations:
 - Tested availability & quality of B100
 - Variety of vessels: tugboat, drift collector, debris vessel, towboat
 - Variety of engine sizes and makes: Detroit Diesel, Caterpillar, Cummins, Onan

USACE Test Results

- No adverse operational impacts
- Availability and quality of fuel confirmed
- Operators and crew prefer B100
- No cold flow issues to date
- Material compatibility issue on 2 vessels (hoses)
- No observed microbial growth, lube oil dilution, water separation, and storage stability
- No filter plugging
- No issue with switch fueling
- ~ 15,975 gallons of diesel replaced with B100 by test (CO₂ emissions reduction from 163.6 MT 0.1 MT)
- Annual fuel consumption of the four test vessels averages ~ 115,000 gallons/year: Replacing that annual amount with B100 has potential to reduce CO₂ emissions from 1,177.7 MT for diesel to 0.8 MT for B100

USACE Test Conclusions

■ Operational Feasibility

- No net impact to USACE operations
- Fuel availability (quality & quantity)
- Supplier participation
- Engine manufacturer participation
- GHG emissions reduction



■ National Application

- Expansion of test results to appropriate USACE vessels
- National contribution to overall GHG emissions reductions
- Fuel Capitalization by DLA-ENERGY
 - All USACE fuel purchased under national DLA-ENERGY contract
 - Larger quantities under contract can result in better pricing



FNTV Future Directions

- Continued USACE & NOAA vessel B100 conversions
 - 10% of 10M gallons converted = 12,024 MTCO₂ reduction
- USACE B100 Emissions testing coordinated with EPA, California Air Resources Board
- Second-generation fuel testing with MARAD, USN, USACE
- More effective leveraging of Federal purchasing power to aid in B100 market development
 - B100 Fuel Capitalization by DLA-ENERGY